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1 GENERAL INTRODUCTION

1.1 THE CENTRAL AND SOUTHERN FLORIDA REGION

The Central and Southern Florida (C&SF) region generally refers to the watershed that starts in the Kissimmee River Basin (near Orlando, Florida) and flows southward through Lake Okeechobee to Florida Bay with waterways to the lower east and lower west coasts of Florida. The 17,930 square miles of the C&SF region are contained in the boundary of the South Florida Water Management District (Figure 1.1.1).

One of the most distinguishing characteristics of the region is the relatively flat terrain. From just south of Lake Okeechobee to Florida Bay, about 110 miles, the land surface elevation only drops about 16 feet. The average depth of Lake Okeechobee is less than 10 feet, the maximum depth is about 18 feet and it covers 730 square miles.

Prior to anthropomorphic influences, water flowed freely from the Kissimmee River Basin southward into Lake Okeechobee (Figure 1.1.2). As the rainy season progressed, from May to October, water began overflowing the southern rim of the lake and provided an expansive sheet flow into the grassy wetlands of the Everglades. In most years, the overflow added to the rainy season runoff to create an extended period of flow into Shark River Slough and through, what is now, Everglades National Park. Shark River Slough rarely dried out.

Flows westward from Lake Okeechobee into the Caloosahatchee River Basin occurred only during the wettest years until a canal connected the lake to the river in the late 1800s. Flows eastward to the St. Lucie estuary did not occur until a canal connection was made in the early 1900s. Prior to development of the lower east coast of Florida, water from the Everglades flowed through the east coast ridge through narrow paths referred to as the transverse glades. Water along the western side of the Everglades flowed through several sloughs to the west coast of Florida into the 10,000 Islands area. Ultimately, the fresh water system fed into the Atlantic Ocean, Biscayne Bay, Florida Bay and the Gulf of Mexico.

With progressive development, the Kissimmee River Basin became a managed series of lakes and rivers. For flood control and navigation, the Caloosahatchee River was dredged and the St. Lucie canal was created. A flood protection levee was built around most of Lake Okeechobee and lake outflows became regulated for multiple purposes. In 1947, Everglades National Park was established. In the 1950s, the Everglades south of the lake were compartmentalized into several large areas; namely, the Everglades Agricultural Area (EAA) and five Water Conservation Areas (WCAs). The EAA is mostly comprised of sugar cane fields that are managed for flood control and water supply needs. The WCAs can be characterized as large, shallow reservoirs managed for several purposes. As the lower east coast of Florida developed, flood control and water supply became increasingly important operations.

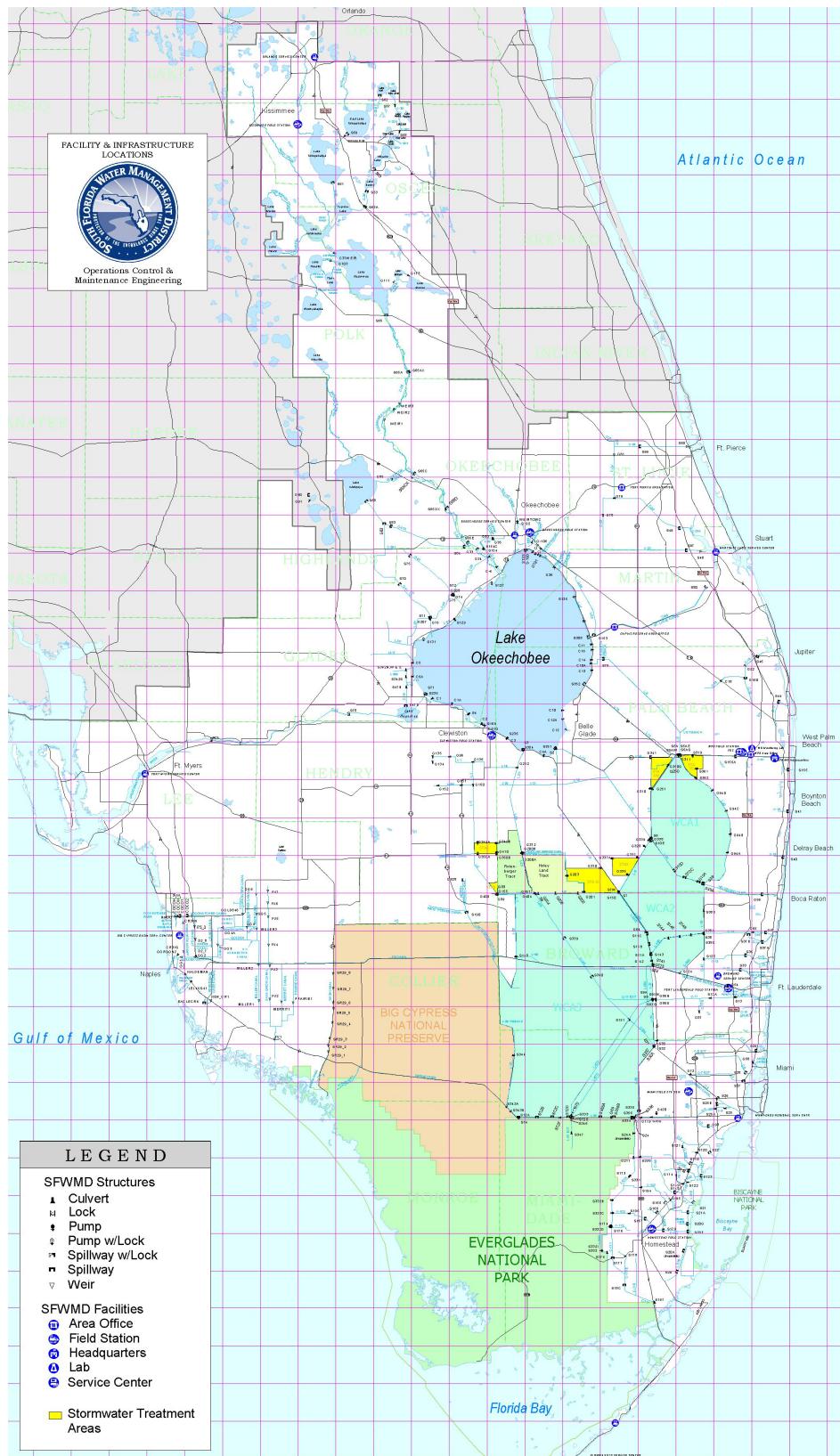


Figure 1.1.1 The Central and Southern Florida Region

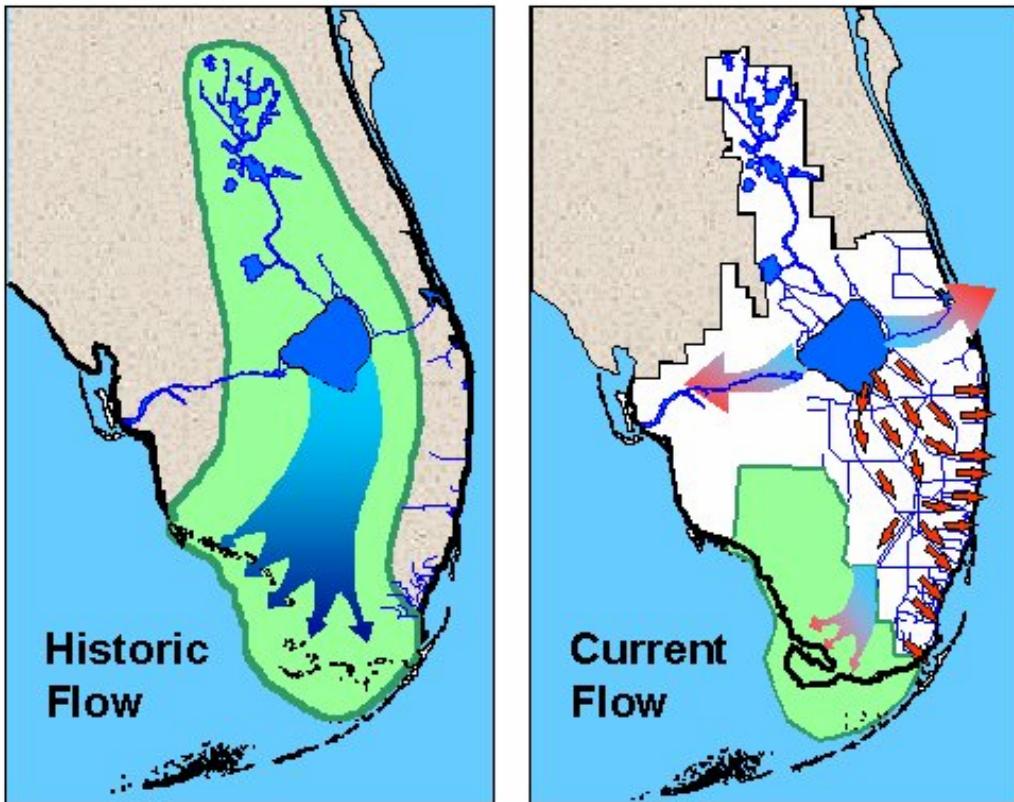


Figure 1.1.2 The Central and Southern Florida Regional Flow Characterization

Since the 1960s, water management has become more intensive and, often, controversial. With the dramatic changes in landscape and water management, many wetland species have been severely impacted. During wet periods, flood operations were designed to move water efficiently to the coast – resulting in salinity conditions too low to support stable estuarine environments. Droughts were exacerbated by the loss of fresh water during wetter times. A dry out in Shark River Slough became an annual event. By the 1980s, there were over 1100 miles of canals and levees and hundreds of water control structures. With the increase in water-related needs of the system, it was clear that a hydrologic numeric model was needed as a tool to evaluate and develop better water resource management options.

The major purposes for which the model was needed were:

1. To simulate hydrology over a large area of South Florida with diverse landscapes and highly inter-connected waterways;
2. To simulate a broad scope of operational rules including rules for environmental flows, flood control, and water supply;
3. To provide a basis for regional and sub-regional evaluations of hydrology, water budgets, and basin interactions; and
4. To provide a tool for conducting evaluations of present and future operations and projects.